Botanical Report for the Proposed White Mountain Estates Housing Site

DRAFT

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Introduction

This document reports the results of a botanical survey at the proposed site of new single family housing in the Chalfant Valley, Mono County, California. The new houses would be located on a lower mountain slope and alluvial fan at the base of the White Mountains, three miles southeast of the town of Chalfant Valley (Figure 1). Proposed new paved roads would access the site from existing single-family housing to the west. Botanical survey work was completed in April and May of 2004 in order to describe the plant communities occupying two contiguous parcels totaling 69.5 acres ("study area") and to search for rare plant occurrences.

The study area, which is located within T55 R33E, SE ¼ of SE ½ of Section 22, gently slopes downward to the west at an average elevation of 4500 ft. (1370 m). The climate is high desert and annual precipitation is influenced by a rain shadow cast by the Sierra Nevada range to the west. Winter and spring precipitation as snow or rain averages 5.5 inches (NOAA, 1982). The average winter temperature is 30° F. The frost-free growing season is about 180 days and is xeric. The summer drought is long, with low humidity and high daytime temperatures. The average summer temperature is 90° F (NRCS, 1996).

In general, the lower mountain slopes and alluvial fans that border the Chalfant Valley remain largely undeveloped. Historical land uses such as mining and irrigated agriculture that have cause soil disturbance or vegetation clearing on-site remain apparent in the current pattern of vegetative cover, but the majority of the study area is relatively undisturbed. The site is proximal to flowing desert springs that function as isolated sources of surface water. Riparian plant communities near the two springs that occur onsite have presumably been altered by a long history of disturbance due to human use.

Literature Search for Sensitive Species

Ten rare native plant species are considered to have some potential to occur within the study area. Nine of these species are herbaceous perennials and one is an herbaceous annual (Table 1). The potentially occurring rare plant species are *Astragalus argophyllus* var. *argophyllus* (silver-leaved milkvetch), *Calochortus excavatus* (Inyo County star tulip), *Chrysothamnus albidus* (white-flowered rabbitbrush), *Crepis runcinata* ssp. *hallii* (Hall's meadow hawksbeard), *Dedeckera eurekensis* (July gold), *Eriogonum shockleyi* var. *shockleyi* (Shockley's buckwheat), *Ivesia kingii* var. *kingii* (alkali ivesia), *Oryctes nevadensis* (Nevada oryctes), *Sidalcea covillei* (Owens Valley checkerbloom), and *Spartina gracilis* (alkali cordgrass). All of these species are adapted to alkaline scrub or meadow habitats.

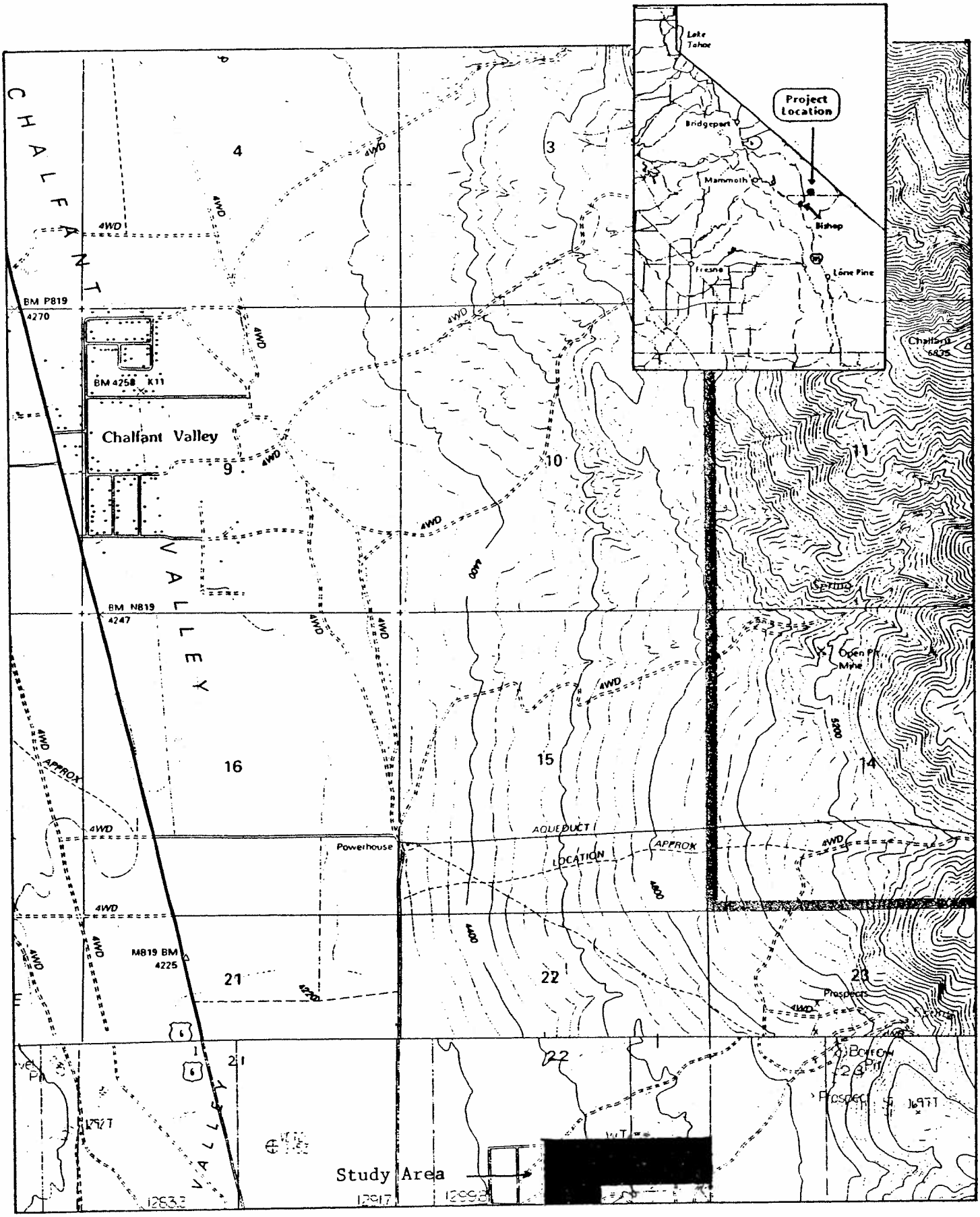

Figure 1. Location of the White Mountain Estates Housing Site Study Area, in Chalfant Valley, Mono County, California.

The list of potentially occurring rare species was compiled during a review of available regional data from the Mono County Planning Department (1993), Halford and Fatooh (1994), U.S. Forest Service (1998a, 1998b), California Native Plant Society (CNPS, 2001), California Department of Fish and Game (CDFG, 2004a), published regional floras by Cronquist, *et. al.* (1984), DeDecker (1984), and Hickman (1993), environmental documents for area projects (Bagley, 1990, 1994, LADWP, 1990, Paulus, 2003), and a March 2004 search of the California Natural Diversity Database records for the Laws and Chalfant Valley Quadrangles. Potentially occurring species were considered "rare" if they are currently listed or proposed as rare, threatened or endangered by the State of California or by the federal government, or if they are listed in the California Native Plant Society's latest inventory of the state's rare and endangered plants (CNPS, 2001, 2004).

Table 1. Rare plant species potentially occurring within the White Mountain Estates study area. Flowering period data is from CNPS (2001). A key to the rank or status symbols follows the table (NL = not listed).

Scientific Name Common Name Life Form	Rank or Status[1]					Habitat	Flowering Period
	USFWS	DFG	USFS	CNPS	NDDB		
Astragalus argophyllus var. *argophyllus* silver-leaved milkvetch herbaceous perennial	NL	NL	NL	2	S1.2	alkaline meadow, seeps	May-July
Calochortus excavatus Inyo County star-tulip herbaceous perennial	NL	NL	NL	1B	S3.1	alkaline meadow, seeps	April-July
Chrysothamnus albidus white-flowered rabbitbrush shrub	NL	NL	NL	4	S3.2	alkaline scrub, meadows	June-November
Crepis runcinata ssp. *hallii* Hall's meadow hawksbeard herbaceous perennial	NL	NL	NL	2	S2?	alkaline meadow, scrub	May-July
Dedeckera eurekensis July gold shrub	NL	R	S	1B	S2.2	carbonate scrub, outcrops	June-August

Table 1 (cont).

Scientific Name Common Name Life Form	Rank or Status[1]					Habitat	Flowering Period
	USFWS	DFG	USFS	CNPS	NDDB		
Eriogonum shockleyi var. *shockleyi* Shockley's buckwheat herbaceous perennial	NL	NL	NL	4	S3.3	gravelly, carbonate soils	May-July
Ivesia kingii var. *kingii* alkali ivesia herbaceous perennial	NL	NL	NL	1B	S2.2	alkaline scrub, meadows	June-August
Oryctes nevadensis Nevada oryctes herbaceous annual	NL	NL	NL	2	S1.1	chenopod scrub	April-June
Sidalcea covillei Owens Valley checkerbloom herbaceous perennial	NL	E	NL	1B	S2.1	alkaline meadow, seeps	April-June
Spartina gracilis alkali cordgrass herbaceous perennial	NL	NL	NL	4	S3.2	alkaline meadow, seeps	June-August

1. Rank or status, by agency: (NL = species not listed)
USFWS = US Fish and Wildlife Service status under the Endangered Species Act (CDFG, 2004a)

DFG = California Department of Fish and Game listings under the Native Plant Protection Act and the California Endangered Species Act (CDFG, 2004a).
E = Endangered
R = Rare

USFS = US Forest Service, Inyo National Forest, Bishop Office (1998a, 1998b)
S = Sensitive List, June 1998
W = Watch List, December 1998

CNPS = California Native Plant Society listings (CNPS, 2001, 2004)
1B = rare and endangered in Calif. and elsewhere
2 = rare, threatened or endangered in California, but more common elsewhere
4 = watchlist for plants of limited distributions

NDDB = California Natural Diversity Data Base rankings by the CDFG (CDFG, 2004a)
S1 is < 6 occurrences or < 1000 individuals or < 1000 acres
S2 is 6-20 occurrences or 1000-3000 individuals or 2000-10000 acres
S3 is 21-100 occurrences or 3000-10000 individuals or 10000-50000 acres
"threat numbers" follow decimal:
.1 = very threatened, .2 = threatened, .3 = no threat currently known,
? indicates CNDDB uncertainty in status.

Plant Species and Community Inventory and Rare Plant Search Methods

Field surveys to inventory existing plant populations, characterize plant communities, and search for potentially occurring rare plants in the study area (Table 1) were performed in April and May 2004. The limits of the botanical survey were determined using a site drawing provided by the Mono County Community Development Department. Permanent boundary markers and recently emplaced orange-painted lathe were used to locate study area edges to the north, east, and south. The current extent of existing housing was used as the study area boundary to the west.

The botanical survey was conducted floristically, using wandering parallel transects. The vegetation was searched carefully while walking slowly. Where gentle slopes exhibiting desert pavement surface were surveyed, transects were spaced at 100 ft. intervals. Transect spacing was reduced where slopes became steeper, with additional attention given to searching rock outcrops or other microhabitats that could provide for increased diversity. Search transect spacing was reduced to approximately 20 ft intervals in a fault scarp area that was encountered in the eastern, upslope half of the study area.

A list of all plant species found in the study area was compiled, using the nomenclature of the Jepson Manual (Hickman, 1993). Species present were identified to the level of taxon necessary for distinguishing rare plants from more common species. Plant communities were also identified and mapped, using the Holland (1986) and CDFG (2004b) systems. Community composition for the perennial community members was estimated from species frequency observations at one to ten points per transect (± 10%, Brower and Zar, 1984). Field surveys totaling 36 hours were performed on April 2-4, May 10, and May 21, 2004, by Jim Paulus, Ph.D., of Bishop, California.

Results

Study Area Plant Community and Species Inventory

Vegetation cover within the study area is for the most part provided by diverse desert-adapted shrubs that form a rather uniform-appearing scrub. The shrub crowns tend to be regularly spaced. Above the elevation 4430 ft and below 4560 ft (1350-1390 m), faulting and erosion have created a zone of steeper, rougher topography. Several gullies there exhibit evidence of ephemeral runoff flows conveyed in 2004. On the longer term, it appears that the deepest gullying has formed at one relatively narrow contour within this zone, where faulting is expressed as an actively eroding yet relatively densely vegetated scarp. Narrow, nearly impassable patches of scrubby riparian vegetation dominated by willows are associated with artesian spring flow in two of the gullies that have formed in this area. The southernmost of these two springs has been disturbed by recent construction of a small impoundment structure. Despite the potential impacts of current water impoundment and diversion, the perennial flow from the southern spring supports a small marsh community embedded within the riparian scrub.

The desert scrub and artesian spring habitats within the study area support four plant communities recognized by Holland (1986). Community classification (Table 2) was based on the frequencies of perennial dominants observed on search transects. The most widespread community was identified as Shadscale Scrub (Holland #36140), with a total area of 57.3 acres (82% of the study area). Shadscale Scrub occurs on moderate to steep slopes both above and below the fault scarp area (Figure 2). The remaining three communities together comprise only 5.6 acres, and all are associated with the fault zone's eroding scarp and artesian spring flow habitats. They are Big Sagebrush Scrub (#35210), Modoc-Great Basin Riparian Scrub (#63600), and Transmontane Freshwater Marsh (#52420). These three assemblages are in overall appearance very different from each other and from the surrounding Shadscale Scrub. They differ in terms of species composition and structure (average height and cover), as well as vadose zone moisture requirements. Therefore, when viewing the study area, the large changes in dominant species frequencies that signal community transitions are at most places readily discernable.

Table 2. Plant communities mapped in 2004 within the White Mountain Estates study area. Community codes from Holland (1986) are given, and are cross-referenced to comparable CNDDB plant community code names (CDFG, 2004b).

Plant Community Name	Holland code	CNDDB code	Acres
Shadscale Scrub	36140	36.320.02	57.3
Big Sagebrush Scrub	35210	35.110.01	5.0
Modoc-Great Basin Riparian Scrub	63600	63.100.00	0.6
Transmontane Freshwater Marsh	52420	52.103.00	0.01
Currently devegetated by disturbance	-	-	6.6

Shadscale Scrub

Shadscale Scrub is considered to be a regionally common and widespread community type (BLM, 1990, LADWP, 1990). Its composition includes species whose presence implies elevated soil salinity and a potentially alkaline habitat. Shadscale Scrub transitions downslope (off-site) to a rabbitbrush-dominated scrub on the valley floor, and transitions upslope (again, just offsite) to a mixed sagebrush scrub. Total Shadscale Scrub cover averages 20% and average community height is 1-2 ft. There is little or no plant litter accumulation.

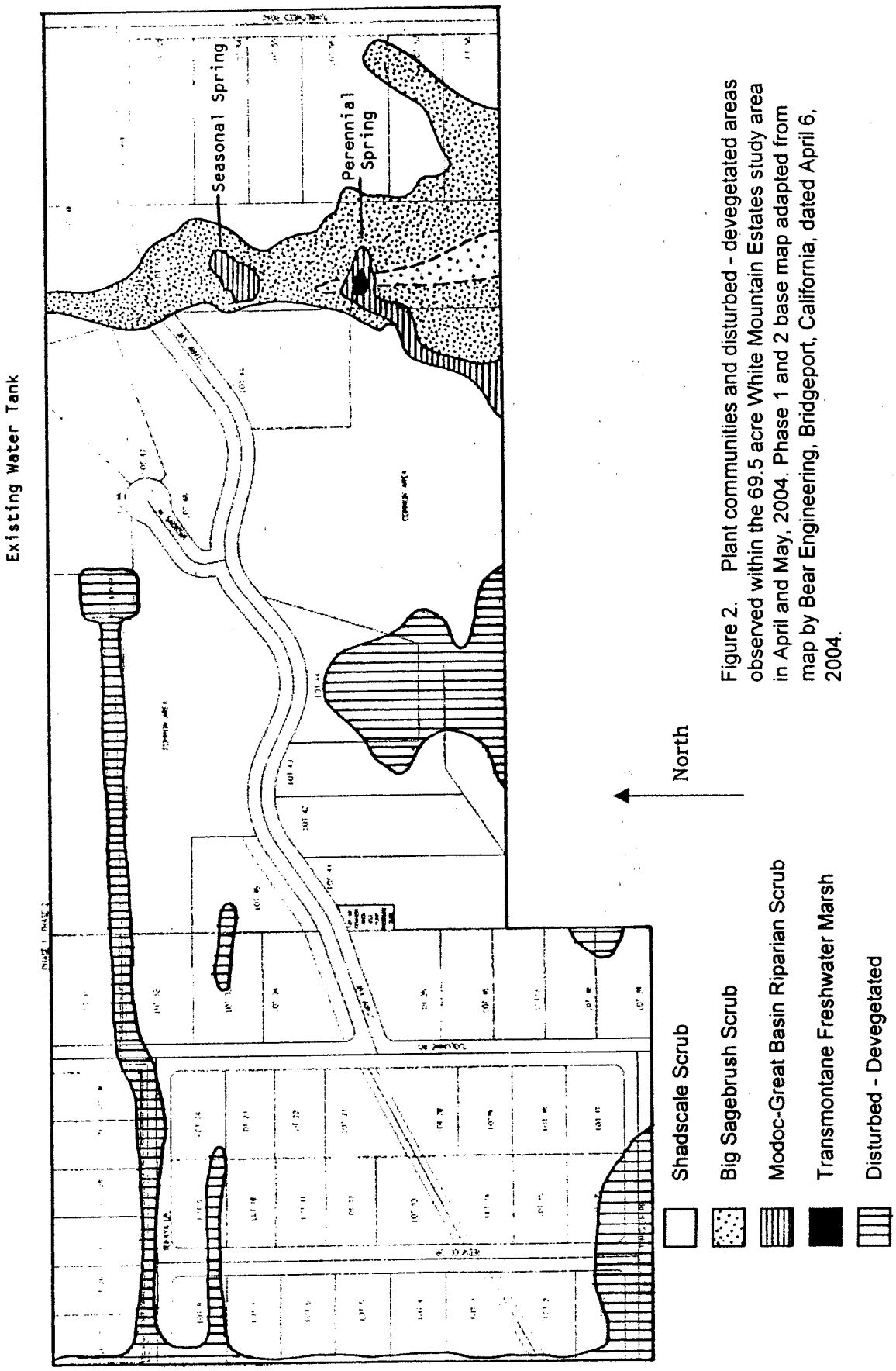

Figure 2. Plant communities and disturbed - devegetated areas observed within the 69.5 acre White Mountain Estates study area in April and May, 2004. Phase 1 and 2 base map adapted from map by Bear Engineering, Bridgeport, California, dated April 6, 2004.

Shadscale Scrub in the study area is a very diverse assemblage of native shrubs (Table 3). The shrub canopy includes four chenopods, shadscale (*Atriplex confertifolia*), hopsage (*Grayia spinosa*), four-wing saltbush (*Atriplex canescens*), and winterfat (*Krascheninnikovia lanata*), which together comprise about 50% of the overall shrub cover. Shadscale is by far the most common of these, with many dead crowns among the current population. Indigo bushes (*Psorothamnus* spp.), bud sage (*Artemisia spinifera*), rubber rabbitbrush (*Chrysothamnus nauseosus*), Nevada ephedra (*Ephedra nevadensis*), cotton thorn (*Tetradymia axillaris* var. *longispina*, and *T. glabrata*), burrobrush (*Hymenoclea salsola*), and spiny menodora (*Menodora spinescens*) are usually present at low frequencies, but can dominate the stand in small patches. The patchy prominence of indigo bush species includes a somewhat disjunct population of Nevada dalea (*P. polydenius*). Nevada dalea has been described variably as "rare in California" (McMinn, 1970), to "locally abundant" (Hickman, 1993). Indigo bush (*P. arborescens* var. *minutifolius*) and Nevada dalea patchily provide up to 60% of the shrub canopy on slopes less than 15%, but only where an even distribution of stony alluvium on the soil surface (desert pavement) is relatively well-developed or has remained relatively intact. Minor shrub components include silver cholla (*Opuntia echinocarpa*). Aside from a few desert ricegrass (*Achnatherum hymenoides*), grasses are absent.

Native perennial and annual herbs are often grouped under the shrubs in the Shadscale Scrub community, giving it an overall open appearance. The most common perennial herbs are wire lettuce (*Stephanomeria* spp.), desert aster (*Xylorhiza tortifolia* var. *tortifolia*), desert trumpet (*Eriogonum inflatum* var. *inflatum*, and wishbone bush (*Mirabilis bigelovii*). Nevada gilia (*Gilia brecciarum* ssp. *brecciarum*) and spineflower (*Chorizanthe* spp.) were the most common native annuals in 2004. Stands of skeletal stems attest to a much greater annual abundance (but not necessarily greater diversity) that was established during the relatively wet 2003 growing season.

Big Sagebrush Scrub

Big Sagebrush Scrub is also a regionally common and widespread community type. Big Sagebrush Scrub in the study area totals 5.0 acres, and is strongly associated with light-colored and fine textured, alkaline soils that exhibit little or no desert pavement. It is not unusual for stands of Big Sagebrush Scrub to occur in moderately alkaline soils (Holland, 1986). This soil type, which may be clearly distinguished from the surrounding coarser alluvial soils as a light-colored band that narrowly trends north to south along the eroding scarp, appears to be locally unusual. It supported no native annuals in 2004 (see Table 3 – note annual species were common elsewhere throughout the study area). Shadscale is absent from the canopy. Big sagebrush (*Artemisia tridentata*) is clearly dominant, and individuals have occasionally attained large stature up to 10 ft in height. Average community height is 3 ft, and total cover averages 30%. Community boundaries are abrupt.

The amounts of canopy cover that are contributed by spineless horsebrush (*Tetradymia glabrata*) and by rubber rabbitbrush are increased in Big Sagebrush Scrub relative to Shadscale Scrub. All other local Shadscale Scrub dominants are meanwhile decreased, becoming minor components or absent from Big Sagebrush Scrub. Species that are found only in Big Sagebrush Scrub include greasewood (*Sarcobatus vermiculatus*), desert peach (*Prunus andersonii*), and

Torrey saltbush (*Atriplex lentiformis* ssp. *torreyi*). Prince's plume (*Stanleya pinnata* var. *pinnata*) contributes 5-10% of the cover. However, with the exception of one small soil inclusion area (see "dwarfed subcommunity", below), perennial herbs other than *S. pinnata* are noticeably absent from this community.

Within Big Sagebrush Scrub, one 0.4 acre soil inclusion that is characterized as having a very powdery, white surface was considered important enough to be mapped as a subcommunity. This distinct subcommunity follows the 4620-4640 ft contour narrowly, although it is interrupted by an incised perennial spring (Figure 2). Within the soil inclusion area, the diversity of dominant and subdominant shrub species that is typical of Big Sagebrush Scrub is largely retained. But big sagebrush individuals are dwarfed, or are replaced by somewhat dwarfed rubber rabbitbrush. The total cover within the subcommunity area is similar to surrounding Big Sagebrush Scrub cover. However, average height is reduced to less than 1 ft due to dwarfed growth habit among the shrub dominants.

New "canopy" species found only in this subcommunity include Shockley's buckwheat (*Eriogonum shockleyi* var. *shockleyi*), a shrub species that exhibits a densely low-matted growth habit and is considered to have a limited distribution in California (CNPS, 2001). Perennial herbs restricted to the small subcommunity area include very sparse saltgrass (*Distichlis spicata*) and Baltic rush (*Juncus balticus*), scattered evening primrose (*Oenothera caespitosa* ssp. *marginata*), yellow cryptantha (*Cryptantha confertiflora*), and narrow-leaved paintbrush (*Castilleja miniata* ssp. *miniata*), and small populations of the rare species silver-leaved milkvetch (*Astragalus argophyllus* var. *argophyllus*) and alkali ivesia (*Ivesia kingii* var. *kingii*). Given the seasonally moist soil habitats that are occupied by the nearest off-site populations of saltgrass, Baltic rush and alkali ivesia, and in order to provide an explanation for the dwarfed habit of the shrubs, it is postulated that local groundwater (possibly saline) intrudes at least episodically to near the soil surface in this subcommunity area.

Riparian Communities

Occurrences of Modoc-Great Basin Riparian Scrub and Transmontane Freshwater Marsh are isolated and uncommon on the relatively dry fans in the Chalfant/Owens Valley landscape, and these communities occur uncommonly in the Great Basin generally. Two occurrences of Modoc-Great Basin Riparian Scrub totaling 0.6 acres are associated with the fault scarp zone: A seasonal or possibly ephemeral seep zone located in a gully in the central fault zone supports the smaller of the two occurrences, while a perennial spring and its channel outflow toward the southern property edge supports a denser and larger, narrowly corridor-shaped area of Modoc-Great Basin Riparian Scrub (Figure 2). This latter occurrence includes a small, embedded Transmontane Freshwater Marsh community near the spring source.

Modoc-Great Basin Riparian Scrub within the study area is dominated by leafy shrubs and small trees (Table 3), giving the community a greener and taller appearance, in contrast to the grey-green crowns of the surrounding upland scrub. The riparian scrub is dominated rather completely by Wood's interior rose (*Rosa woodsii* var. *ultramontana*), narrowleaf willow (*Salix exigua*), and a lesser arroyo willow (*S. lasiolepis*) component. Understory vegetation is sparse, probably due to the high density of the canopy and a thick accumulation of leaf duff. Total cover

is 100%; the corridor is nearly impassable due to dense willow stems and thorny, thicket-like rose clumps. Average community height is 5 ft. The riparian corridor transitions to upland scrub just beyond the southern property edge, at about the current extent of the spring-fed surface flow.

Transmontane Freshwater Marsh occupies a small area (about 25 ft x 15 ft) at the perennial spring flow source. Surface water is ponded throughout the extent of the marsh, but open water is completely obscured by accumulated vegetation litter. The total cover in Transmontane Freshwater Marsh is 100%, and average height is 4 ft. The only species occurring within this community are emergent cattail (*Typha* sp.) and goldenrod (*Solidago* sp.). Modoc-Great Basin Riparian Scrub very narrowly surrounds the ponded water on all sides, except where the former channel bottom at the tail of the marsh was recently disturbed (filled) to construct a crude dam. Currently, flowing water from the southern spring is partially impounded by the dam and a portion of the flow is conveyed through a pipe to an off-site location.

Riparian communities comprise a small portion of the study area. However, the springs that support them are not isolated. Rather they are the northernmost flows associated with a large fault-controlled spring complex located to the south on City of Los Angeles Department of Water and Power (LADWP) and Bureau of Land Management (BLM) lands outside the study area (Figure 3). LADWP surveys (unpubl. data, Bishop LADWP office) refer to this complex as "Springs North of Coldwater Canyon", and describe the *Calochortus excavatus* population there as the only one known east of the Owens River (*ie.*, at the base of the White Mountains rather than the base of the Sierra Nevada) and the northernmost known extent of the range of the species. This complex *may* include meadow habitat identified as 6-10-1C (BLM, 2002, site identification is tentative), which is described as alkaline meadow habitat, where 1) a small *C. excavatus* population is present in the meadow, 2) tamarisk treatment has been applied, and 3) cattle grazing is not evident. Riparian communities (and the surrounding Big Sagebrush Scrub) within the study area are therefore an ecologically contiguous but legally disjunct part of a relatively unspoiled larger habitat that is being managed in accordance with LADWP land use policy (no current exports of water from the springs in question) and with the Owens Basin Wetland and Aquatic Species Recovery Plan (US Fish and Wildlife Service, 2000).

Disturbed Areas and Non-native Plants

Mechanically disturbed areas totaling 6.6 acres (9.5% of the study area) include an historic ore mining operation, irrigated agriculture (now long abandoned), and recent scrapes associated with an existing water tank (Figure 2). Recent water system construction has disturbed strips of upland scrub to the west of the tank. At the time of survey, scrub recovery in these areas was observed to range from <1% to about 5% total cover. The portion of the large drainage that intersects the southern property edge has also been devegetated and is now devoid of native plants. The incised channel there is now being used to raise domestic animals, and historic mining structures are present on the slope above (Figure 3). A noticeable shift in perennial dominance to rubber rabbitbrush at the site of former irrigated agriculture suggests that disturbance in this area could facilitate a long term shift in the plant community. Disturbed areas that were mapped (Figure 2) do not include numerous existing dirt roads and ATV/motorcycle trails and tracks. The creation of new trails appears to be ongoing. Disturbance, especially OHV-

related disturbance, is reducing the area of competent desert pavement remaining on-site. The area of dry scrub above the scarp, totaling 9.2 acres, has at present been subjected to less disturbance than the 48.1 acres of scrub vegetation located downslope of the scarp and nearer to existing housing.

The non-native species bull thistle (*Cirsium vulgare*), yellowspine thistle (*Cirsium ochrocentrum*), jimson weed (*Datura stramonium*), and tamarisk (*Tamarix ramosissima*) were found to be confined to mechanically disturbed areas. The annual Russian thistle (*Salsola tragus*), a native of Eurasia, was the only non-native species found to occur widely among the native plants elsewhere in the study area. Russian thistle was a common, widespread member of the annual wildflower assemblage in 2004 throughout Shadscale Scrub, at the ecotones of Modoc-Great Basin Riparian Scrub, and in mechanically disturbed areas. Russian thistle has become naturalized throughout Shadscale Scrub in particular. Downslope from the fault scarp, this species occurs at sometimes high abundance even in relatively undisturbed areas.

Russian thistle is considered a noxious weed, however it is currently rated by CalEPPC (1999) pest listings as "considered but not listed", and by CDFA (2000) as "C: weeds not subject to eradication actions by the CDFA". Tamarisk is rated by CalEPPC as "A-1: The most invasive exotic plants, and are already widespread". Bull thistle is rated by CalEPPC as "B: Wildland plants of lesser invasiveness", while yellowspine thistle is rated by CDFA as "A: Eradication, containment, rejection or other holding action at the state-county level". The risk for further invasiveness by Russian thistle would be increased at this site by any traffic of activity that would further decrease the integrity of the remaining desert pavement surfaces. The risk for tamarisk, bull thistle, and yellowspine thistle invasiveness within the study area would be increased by any water use practices that would enhance or decrease baseline spring flows, or changes in runoff pattern which would cause additional scour within the gullies associated with the fault zone (eg., higher runoff from more upslope impervious surfaces), or which would create disturbed soils in areas where a relatively high groundwater table occurs and the habitat is suitable for phreatophytes.

Sensitive Plant Communities and Species

The scrub and riparian plant communities that were identified within the study area are not considered sensitive by the CDFG (CDFG, 2004b). Single populations of three sensitive plant species - *Astragalus argophyllus* var. *argophyllus*, *Eriogonum shockleyi* var. *shockleyi*, and *Ivesia kingii* var. *kingii* - were found to occur within the study area in 2004 as a result of the botanical survey. The distributions of the three rare plant populations (Figure 4) were found to be completely within the dwarfed subcommunity central to Big Sagebrush Scrub, and the mapped extent of the dwarfed subcommunity within Big Sagebrush Scrub (Figure 2) would serve as a useful guide to aid planning for avoiding the rare plants (*A. argophyllus* var. *argophyllus*, *E. shockleyi* var. *shockleyi*, and *I. kingii* var. *kingii*) within the proposed project.

Seven *A. argophyllus* var. *argophyllus* (Appendix A), some with flowers present on May 10 and fruits on May 31, were found in an area of 200 square feet at the dwarfed subcommunity within Big Sagebrush Scrub. These plants are immediately adjacent to the eastern edge of a devegetated roadway, which enters the study area from the south and approaches the constructed

impoundment at the perennial spring. All seven individuals were found in a location threatened by disturbance even if no further development occurs, as the roadway to the perennial spring appears to be used for OHV access. The diminutive milkvetch *A. argophyllus* var. *argophyllus* is listed by the CNPS as "rare, threatened, or endangered in California but more common elsewhere" (List 2). These silver-leaved milkvetch are assumed to be the northernmost members of a larger population that was documented in the area in 1988 (CDFG, 2004c). However, a quick traversal of the larger spring complex area to the south on May 10 revealed no further individuals. More intensive sampling would be required to accurately assess this population's current size and distribution if it extends outside the study area. If the total population was indeed 50 plants within the study area in 1988, then the current trend is toward extinction of this population.

A population of 23 *Ivesia kingii* var. *kingii* (Appendix B) cohabitates the same area as silver-leaved milkvetch. Several individuals were blooming on May 31. This species occurs in moist habitats at many spring and lakeshore sites in the Owens Valley to the south and Long Valley to the north. It is listed by the CNPS as "rare and endangered in California and elsewhere" (List 1B). The *I. kingii* var. *kingii* population in the study area occurs entirely within the area threatened by disturbance when the roadway to the perennial spring is used.

A total of 260 *Eriogonum shockleyi* var. *shockleyi* (Appendix C) were found within the area mapped as Big Sagebrush Scrub – dwarfed subcommunity. Nearly all were blooming on May 10. Shockley's buckwheat inhabits an area of approximately 15,000 square feet, mostly south of the southern spring, but extending to a patch of five individuals located just north of the northern spring. This species is watch-listed by the CNPS as a "plant of limited distribution" (List 4).

It is likely that improved access and the project-related increase local human population will result in a pattern of greater use of adjacent unfenced and public lands. If OHV use increases, as might be expected given current use patterns, there will be increased risk that trampling by traffic will impact the rare plant populations that occur within (and nearby) the study area in association with the largely off-site spring complex known as "Springs North of Coldwater Canyon" (Figure 3). If the use of new water production wells or increased local pumping results in a lowering of the water table that now appears to be strongly associated with the unusual soil and often dwarfed Big Sagebrush Scrub along the contour of the fault scarp, the habitat would be altered to favor larger shrubs and potentially invasive weeds over the rare native plants that appear to function there now as marginal environment specialists.

A search of the Natural Diversity Database (CDFG, 2004c) found one additional, previously cataloged occurrence, a population of about 350 *Calochortus excavatus* near or possibly at the southern edge of the study area. In CNDDB documentation and in a LADWP survey report (survey date 5/15/93), the location data, ecological habitat description and co-occurring species list documented for this population all closely match the fault scarp habitat within the study area. However, no bulbiferous plants having grass-like leaves like *Muilla coronata* or *C. excavatus* were found within the study area in 2004. It is believed that the documented *C. excavatus* population actually occurs in habitat that is similar to the fault scarp but is in the LADWP parcel located immediately south of the study area (P. Hubbard, personal communication 6-15-04). If this is so, any previous reference to this species occurring Section 22 (unpubl. 2002 data, LADWP Bishop office), likely refers to a population that occurs in Sections

25 or 26. No off-site search of LADWP property for the previously documented *C. excavatus* population was included in the survey work reported here.

It was somewhat less simple to exclude the cordgrass *Spartina gracilis*. This species has been found in scattered populations in the Owens Valley. The nearest previously documented occurrence, which was in the Bishop area (Paulus, 1996) about 10 miles to the south of the study area, has been extirpated due to development. *S. gracilis* typically occurs in alkaline meadow situations in the Owens Valley, and the literature search uncovered no previously documented occurrences of this species in Big Sagebrush Scrub. Differentiation from the common species saltgrass (*Distichlis spicata*), which bears a close resemblance in terms of vegetative structures, and which was found growing among the dwarfed subcommunity shrubs in Big Sagebrush Scrub, was for the most part based upon leaf characters. Close inspection of grasses within the Big Sagebrush Scrub community revealed several saltgrass inflorescence structures that had persisted from the 2003 growing season, strengthening the conclusion that all plants present within the study area are *D. spicata*. No new or persistent, relatively tall, and one-sided inflorescence structures typical of *S. gracilis* were found.

Dedeckera eurekensis, a CNPS list 1B and CDFG Rare species, is known to occur within 1.1 miles of the study area's eastern edge, within the same drainage that forms the study area's fan landscape but at a higher elevation of 5600 ft. Although *D. eurekensis* is a member of the Polygonaceae, it lacks the fused stipules and bracts typical of that family and so may be confused with more common shrubs when not flowering. All shrub species present were observed to flower during the time of survey, with the exceptions of *Artemisia tridentata* and *Chrysothamnus nauseosus*. The late-blooming *C. nauseosus* has felted stems and so could not be confused with the glabrous to minutely hairy *D. eurekensis*. No other late-blooming shrubs with simple, oblanceolate, entire, and non-mealy-scurfy leaves were found in the study area, as would be expected if *D. eurekensis* occurs there.

Sidalcea covillei, a CNPS list 1B and CDFG Endangered species, is known to occur in several populations 6-7 miles to the south of the study area. This species is known primarily from the Owens Valley, but habitat characteristics such as elevated groundwater, sparse saltgrass, and absence of grazing are suggestive that suitable habitat exists within the study area. In known populations, it is often found with *C. excavatus*. The common species *Eremalche exilis*, the only herb found in the study area with palmately veined leaves and exhibiting white to purple petals (as would be expected of *S. covillei*), was differentiated from *S. covillei* by the former's annual habit and generally smaller, prostrate growth habit. Stigmas were consistently observed to be head-like, as expected among the *Eremalche*, in contrast to the linear stigma shape typical of *Sidalcea*.

The presence of *Chrysothamnus albidus* in the study area was excluded when no members of the genus *Chrysothamnus* having unfelted stems could be found. Other glabrous-stemmed shrubs with linear leaves (*eg.*, *Tetradymia* spp.) exhibited thorns or yellow flowers in May.

It was concluded that *Crepis runcinata* spp. *hallii* does not occur within the study area, based upon leaf shapes and arrangements exhibited by the perennial herbs that were found within the study area. No perennial herbs with large, unarmed, and basally clustered leaves were found during the survey. The nearest known population of this rare plant is 9.3 miles to the south.

Oryctes nevadensis is an annual herb. It is known to occur within 6.3 miles to the southwest at an elevation of 4100 ft. The only plants with solanaceous flower structures found within the study area were identified as *Lycium andersonii*, which is a relatively large shrub, and the non-native annual *Datura stramonium*. The moderate abundances and high diversity of annuals found during the plant survey work suggest that annuals such as *Loeflingia squarrosa* var. *artemisiarum* or *O. nevadensis* would have germinated and thus would have been found in 2004 if a population in fact existed in the seedbank.

During survey work in 2004, no evidence was seen of grazing by range cattle. Areas of concentrated ORV trampling, primarily by ATV's, were widely scattered. It is concluded that grazing and trampling activities did not influence the ability to detect rare plants during the survey.

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Table 3. Plant species list for the proposed White Mountain Estates housing development near Chalfant Valley, Mono County, California, in April and May, 2004. Habit and occurrence codes given below.

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Ephedraceae						
Ephedra nevadensis	Nevada ephedra	NS	x	x		
Asteraceae						
Artemisia spinifera	bud sage	NS	x			
Artemisia tridentata ssp. *tridentata*	big sagebrush	NS	x	x		
Chaenactis carphoclinia var. *carphoclinia*	pebble pincushion	NAH	x			
Chaenactis macrantha	Mojave pincushion	NAH	x			
Chrysothamnus nauseosus	rubber rabbitbrush	NS	x	x		
Cirsium vulgare	bull thistle	IBH		x_C		
Cirsium cf. *ochrocentrum*	yellowspine thistle	IBH		x_C		
Conyza canadensis	horseweed	NAH	x_D			
Glyptopleura marginata	carveseed	NAH	x			
Hymenoclea salsola var. *salsola*	burrobrush	NS	x	x		
Iva axillaris ssp. *robustior*	poverty weed	NPH			x_C	
Malacothrix glabrata	desert dandelion	NAH	x			
Solidago spectabilis	showy goldenrod	NPH			x	x
Solidago cf. *altissima*	late goldenrod	IPH			x_D	
Stephanomeria exigua ssp. *exigua*	small wirelettuce	NAH	x			
Stephanomeria pauciflora var. *pauciflora*	few-flowered wirelettuce	NPH	x			
Tetradymia axillaris var. *longispina*	longthorn horsebrush	NS	x			
Tetradymia glabrata	little-leaf horsebrush	NS	x	x		
Xylorhiza tortifolia var. *tortifolia*	desert aster	NPHS	x			

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Boraginaceae						
Amsinckia tessellata var. *tessellata*	devil lettuce	NAH	x			
Cryptantha barbigera	bearded cryptantha	NAH	x			
Cryptantha circumscissa	cushion cryptantha	NAH	x			
Cryptantha confertiflora	yellow cryptantha	NPH		x_C		
Cryptantha echinella	prickly cryptantha	NAH	x			
Cryptantha micrantha	redroot cryptantha	NAH	x			
Cryptantha pterocarya	wingnut cryptantha	NAH	x			
Cryptantha simulans	pinewoods cryptantha	NAH	x			
Brassicaceae						
Descurainia incisa ssp. *filipes*	tansy mustard	NAH	x			
Lepidium densiflorum var. *pubicarpum*	small-seeded pepperweed	NAH	x			
Lepidium flavum var. *flavum*	desert gold	NAH	x			
Lepidium fremontii	Fremont pepperweed	NPHS	x			
Stanleya pinnata var. *pinnata*	prince's plume	NPHS		x		
Streptanthella longirostris	longbeak streptanthella	NAH	x			
Cactaceae						
Opuntia echinocarpa	silver cholla	NS$	x			
Caprifoliaceae						
Lonicera sp.	honeysuckle	NSV			x_D	

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Chenopodiaceae						
Atriplex canescens ssp. *canescens*	four-wing saltbush	NS	x	x	x	
Atriplex confertifolia	shadscale	NS	x			
Atriplex lentiformis ssp. *torreyi*	Torrey saltbush	NS		x		
Grayia spinosa	hop sage	NS	x			
Krascheninnikovia lanata	winter fat	NS	x			
Salsola tragus	Russian thistle	IAH	x			
Sarcobatus vermiculatus	greasewood	NS		x_C		
Cuscutaceae						
Cuscuta sp.	dodder	NV*	x			
Fabaceae						
Astragalus argophyllus var. *argophyllus*	silverleaf milkvetch	NPH		x_C		
Glycyrrhiza lepidota	wild licorice	NPH		x_C		
Psorothamnus arborescens var. *minutifolius*	small-leaved indigo bush	NS	x			
Psorothamnus polydenius (var. *subnuda* incl.)	indigo bush	NS	x			
Geraniaceae						
Erodium cicutarium	crane's bill filaree	IAH	x_D			
Hydrophyllaceae						
Phacelia fremontii	Fremont's phacelia	NAH	x			
Lamiaceae						
Salvia columbariae	chia	NAH	x			

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Loasaceae						
Mentzelia nitens	shining blazingstar	NAH	x			
Mentzelia obscura	Pacific blazingstar	NAH	x			
Malvaceae						
Eremalche exilis	white mallow	NAH	x			
Sphaeralcea ambigua var. *ambigua*	apricot mallow	NPH	x			
Nyctaginaceae						
Mirabilis alipes	winged four o'clock	NPH	x			
Mirabilis bigelovii	wishbone bush	NPHS	x			
Oleaceae						
Menodora spinescens	spiny menodora	NS	x			
Onagraceae						
Camissonia claviformis ssp. *lancifolia*	lance-leaf brown eyes	NAH	x			
Oenothera caespitosa ssp. *marginata*	fragrant evening primrose	NPH		x_C		
Papaveraceae						
Eschscholzia minutiflora	pygmy poppy	NAH	x			
Polemoniaceae						
Gilia brecciarum ssp. *brecciarum*	Nevada gilia	NAH	x			
Loeseliastrum schottii	Schott's calico	NAH	x			

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Polygonaceae						
Chorizanthe brevicornu var. *spathulata*	brittle spinyflower	NAH	x			
Chorizanthe rigida	spiny herb	NAH	x			
Chorizanthe xanti var. *xanti*	Riverside spinyflower	NAH	x			
Eriogonum inflatum var. *inflatum*	desert trumpet	NPHS	x			
Eriogonum maculatum	spotted buckwheat	NAH	x			
Eriogonum nidularium	birdnest buckwheat	NAH	x			
Eriogonum shockleyi var. *shockleyi*	Shockley buckwheat	NPH		x_C		
Rosaceae						
Ivesia kingii var. *kingii*	alkali ivesia	NPH		x_C		
Prunus andersonii	desert peach	NS		x_C		
Rosa woodsii var. *ultramontana*	interior rose	NS			x	
Salicaceae						
Salix exigua	narrow-leaf willow	NS			x	
Salix lasiolepis	arroyo willow	NS			x	
Scrophulariaceae						
Castilleja miniata ssp. *miniata*	giant red paintbrush	NPH		x_C		
Solanaceae						
Datura stramonium	jimson weed	IAH	x_D			
Lycium andersonii	Anderson box thorn	NS	x			

Species		Habit	Occurrence Within Study Area: Shadscale Scrub	Big Sagebrush Scrub	Riparian Scrub	Freshwater Marsh
Tamaricaceae						
Tamarix ramosissima	tamarisk	IT	x_D			
Vitaceae						
Vitis vinifera	domestic grape	ISV	x_D			
Juncaceae						
Juncus balticus	Baltic rush	NPGL		x_C		
Poaceae						
Achnatherum hymenoides	indian ricegrass	NPG	x			
Distichlis spicata	saltgrass	NPG		x_C		
Phragmites australis	common reed	NPG			x	
Sporobolus airoides	alkali sacaton	NPG		x_C		
Typhaceae						
Typha domingensis	southern cattail	NPGL				x

Habitat restrictions observed within study area:

C Restricted to channels and between-channel slopes in fault scarp area, within soil inclusion where rare plants occur.

D Restricted to areas disturbed by past or present land uses, where native vegetation is currently absent or sparse.

key to growth habit codes:

A = annual	N = native
G = grass	P = perennial
GL = grasslike	S = shrub
H = herb	$ = succulent
HS = half shrub	* = parasitic
I = introduced	V = vine

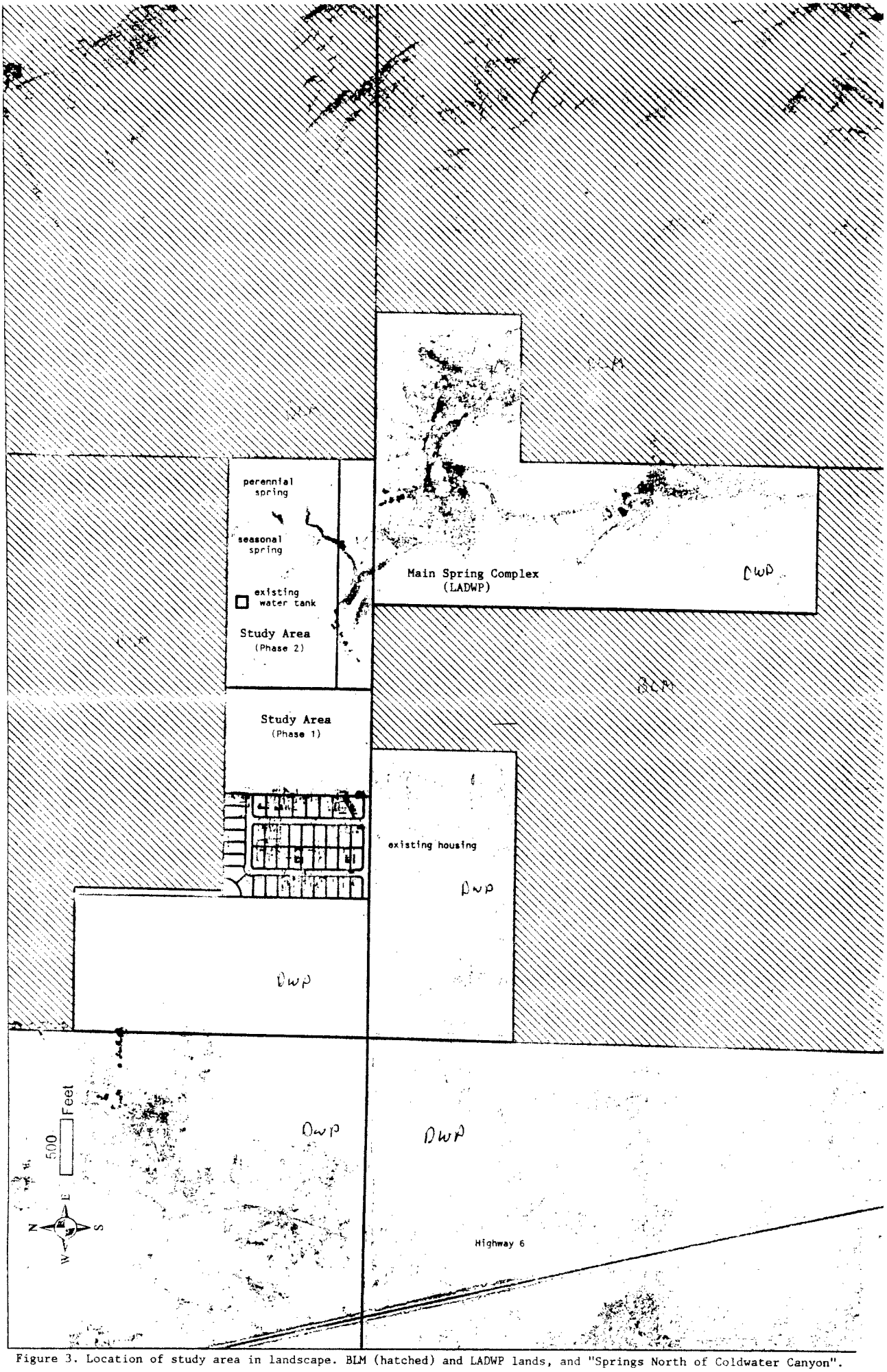


Figure 3. Location of study area in landscape. BLM (hatched) and LADWP lands, and "Springs North of Coldwater Canyon".

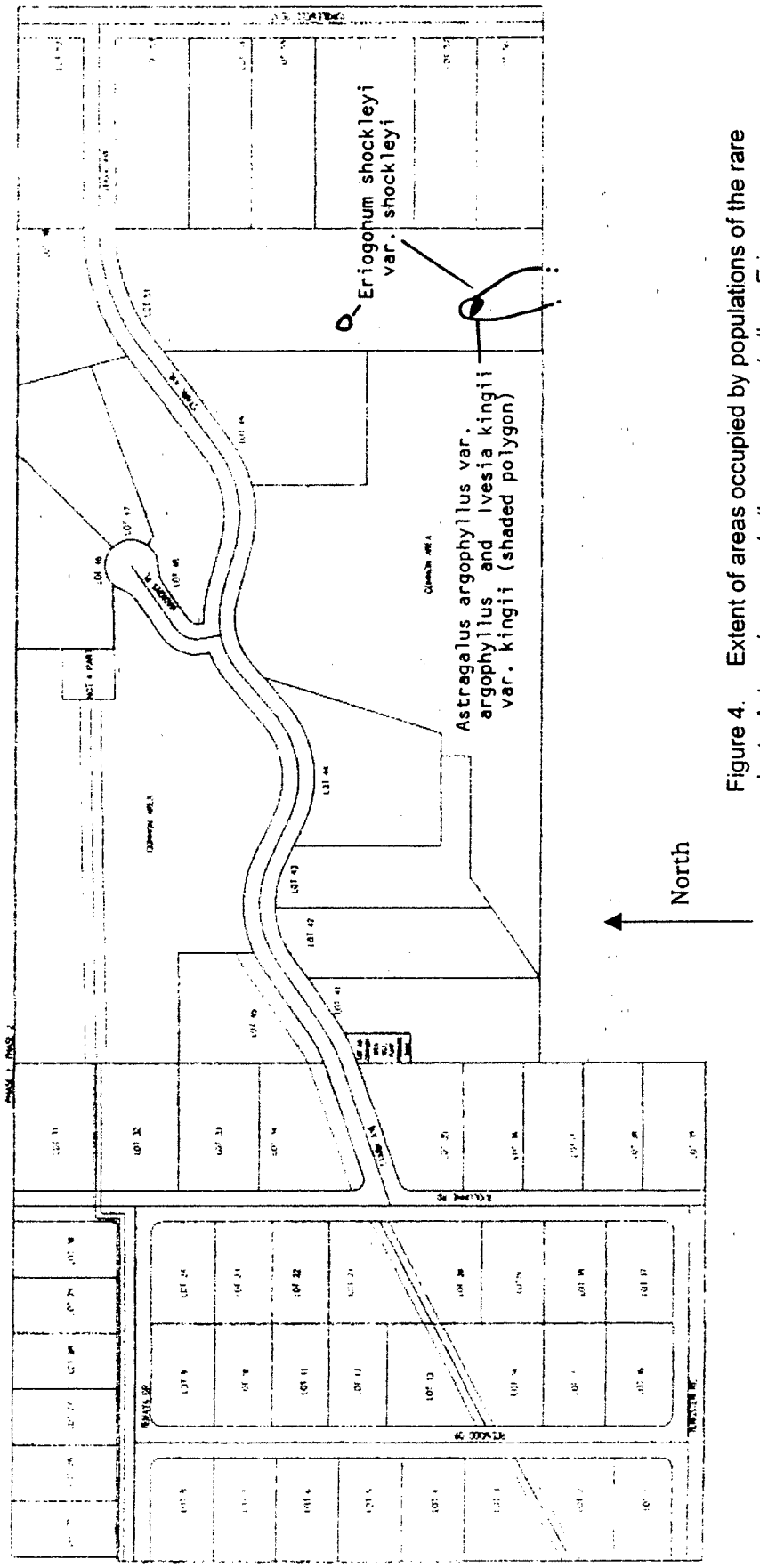
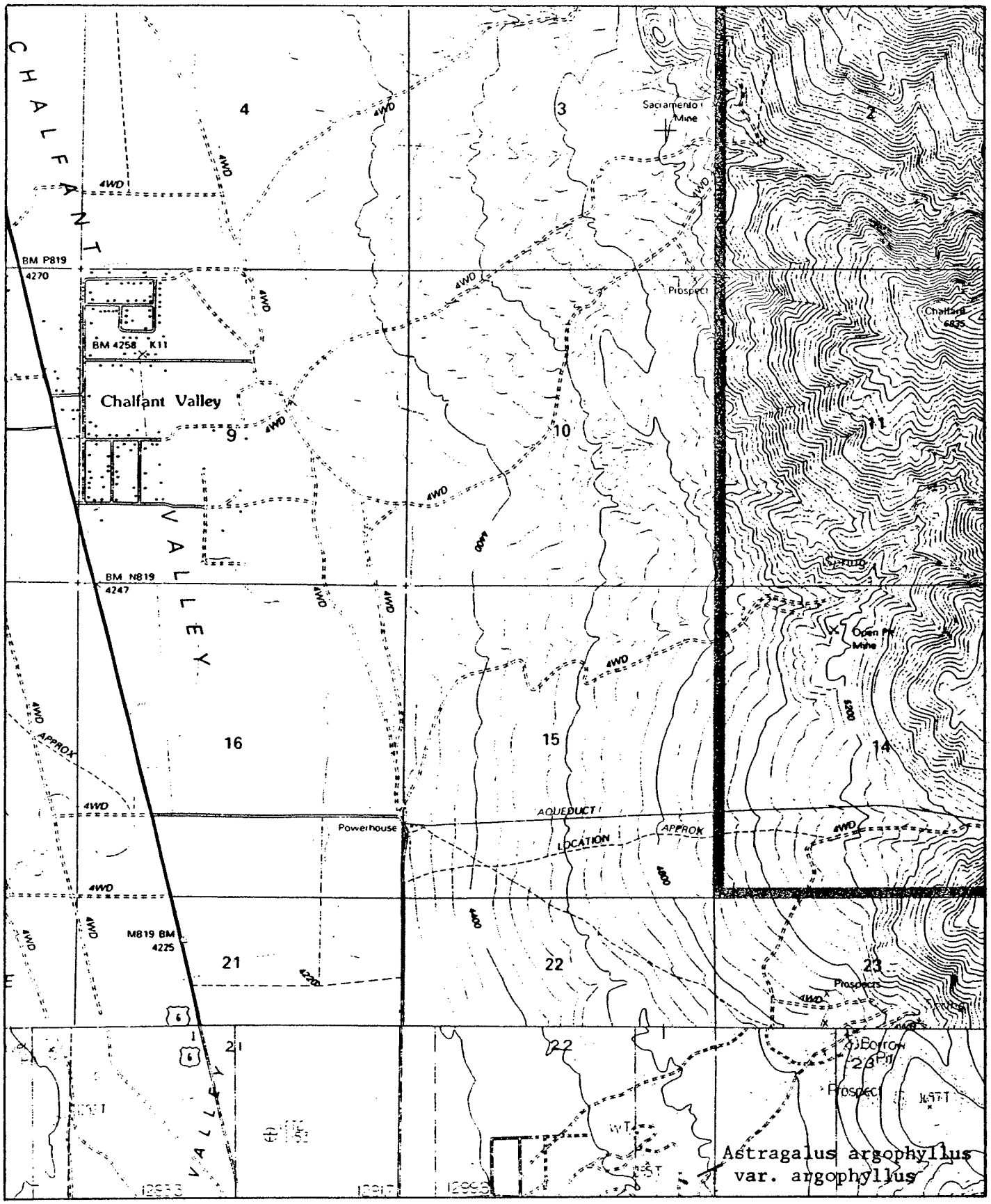


Figure 4. Extent of areas occupied by populations of the rare plants *Astragalus argophyllus* var. *argophyllus*, *Eriogonum shockleyi* var. *shockleyi*, and *Ivesia kingii* var. *kingii* observed within the 69.5 acre White Mountain Estates study area in April and May, 2004.

APPENDICES A - C

Rare plant reports submitted to CNDDB in July 2004



App. A. Location and extent of *Astragalus argophyllus* var. *argophyllus* population on the USGS Laws 7.5' Quadrangle in Mono County, California (scale 1:24000).

North

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: WHDAB@dfg.ca.gov

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work: 05 - 21 - 04

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Astragalus argophyllus var. argophyllus

Common Name: silver-leaved milkvetch

Species Found? ☒ Yes ☐ No _____ If not, why?

Total No. Individuals 7 Subsequent Visit? ☐ yes ☒ no
Is this an existing NDDB occurrence? _____ Yes, Occ. # ☒ no ☐ unk.

Collection? If yes: No Number _____ Museum / Herbarium

Reporter: J. Paulus
Address: P.O. Box 244
Bishop, CA 93515
E-mail Address: _____
Phone: (760) 937-7177

Plant Information

Phenology: 100 % vegetative 10 % flowering 10 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Mono Landowner / Mgr.: Bob Stark
Quad Name: Laws Elevation: 4520 ft
T 5S R 33E Sec 22 , SE ¼ of SW ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): _____
T___ R __ Sec ___ , ___ ¼ of _____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
Datum: NAD27☐ NAD83☐ WGS84☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10☐ UTM Zone 11☐ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Easting/Longitude _____ Northing/Latitude _____

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Alkaline, powdery white soil associated with a fault scarp. Population is situated between fault-controlled springs on an open, sunny slope (north-facing). Surrounding vegetation is Big Sagebrush Scrub, but all plants near population are dwarfed. Occurs with Eriogonum shockleyi var. shockleyi, Ivesia kingii var. kingii, also Cryptantha confertiflora, Oenothera caespitosa ssp. marginata.

Other rare species?

Site Information Overall site quality: ☐ Excellent ☐ Good ☐ Fair ☒ Poor

Current / surrounding land use: Eisting housing 1000 ft downslope to west. BLM/LADWP to N, E, and S.

Visible disturbances: Population adjacent to devegetated OHV trail, many ATV tracks in scrub.

Threats: Site proposed for development (housing). Increased OHV incursions, groundwater development, possibly grazing.

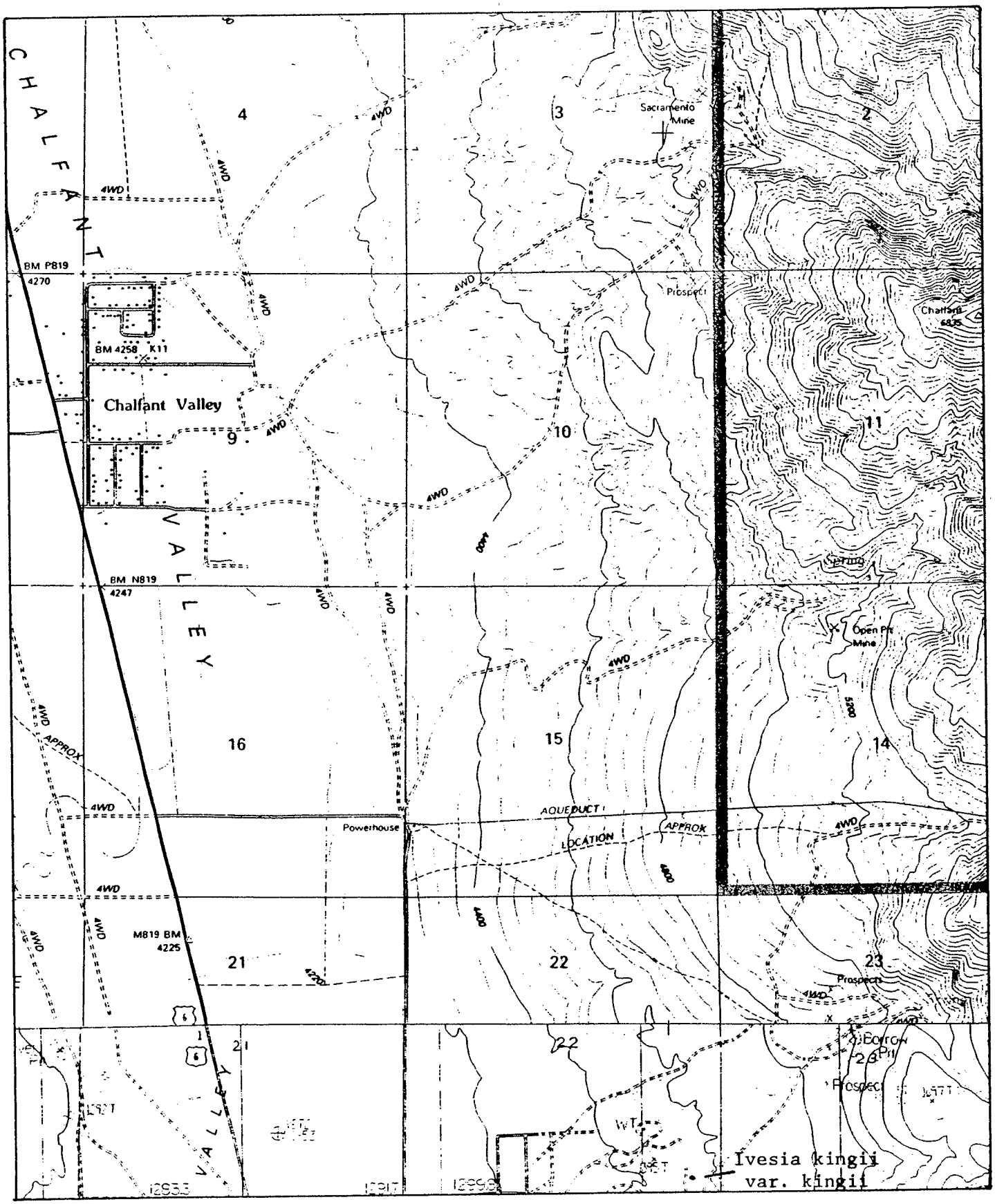
Comments: Population may be northernmost plants in larger pop. at large spring/meadow to S.

Determination: *(check one or more, and fill in blanks)*
☒ Keyed (cite reference): Hickman, 1993
☐ Compared with specimen housed at: _____
☒ Compared with photo / drawing in: Cronquist, et al,
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? ☐ yes ☐ no

FG/WHDAB/1747 Rev.10/20/03



App. B. Location and extent of *Ivesia kingii* var. *kingii* population on the USGS Laws 7.5' Quadrangle in Mono County, California (scale 1:24000).

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: WHDAB@dfg.ca.gov

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work: 05 - 21 - 04

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Ivesia kingii var. kingii

Common Name: alkali ivesia

Species Found? ☒ Yes ☐ No _____ If not, why?

Total No. Individuals 23 Subsequent Visit? ☐ yes ☒ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☒ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: J. Paulus
Address: P.O. Box 244
Bishop, CA 93515
E-mail Address: _____
Phone: (760) 937-7177

Plant Information

Phenology: 100 % vegetative 20 % flowering _____ % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Mono
Landowner / Mgr.: Bob Stark
Quad Name: Laws
Elevation: 4520 ft

T 5S R 33E Sec 22 , SE ¼ of SW ¼, Meridian: H☐ M☐ S☐
T___ R __ Sec ___ , ___ ¼ of _____ ¼, Meridian: H☐ M☐ S☐

Datum: NAD27☐ NAD83☐ WGS84☐
Coordinate System: UTM Zone 10☐ UTM Zone 11☐ *OR*
Coordinates: Easting/Longitude _____ Northing/Latitude _____

Source of Coordinates (GPS, topo. map & type): _____
GPS Make & Model _____
Horizontal Accuracy _____ meters/feet
Geographic (Latitude & Longitude) ☐

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Alkaline, powdery white soil associated with a fault scarp. Population is situated between fault-controlled springs on an open, sunny slope (north-facing). Surrounding vegetation is Big Sagebrush Scrub, but all shrubs near population are dwarfed. Occurs with Astragalus argophyllus var. argophyllus, Eriogonum shockleyi var. shockleyi, also Cryptantha confertiflora, Oenothera caespitosa ssp. marginata.

Other rare species?

Site Information Overall site quality: ☐ Excellent ☐ Good ☐ Fair ☒ Poor

Current / surrounding land use: Existing housing 1000 ft downslope to west. BLM/LADWP to N, E, and S.

Visible disturbances: Population is adjacent devegetated OHV trail, with many ATV tracks in scrub.

Threats: Site proposed for housing developemnt. Apparent increased OHV incursions, ground-water development associated with existing housing, will increase with new housing.

Comments: Population may extend to BLM land at large spring complex immediately south.

Determination: *(check one or more, and fill in blanks)*

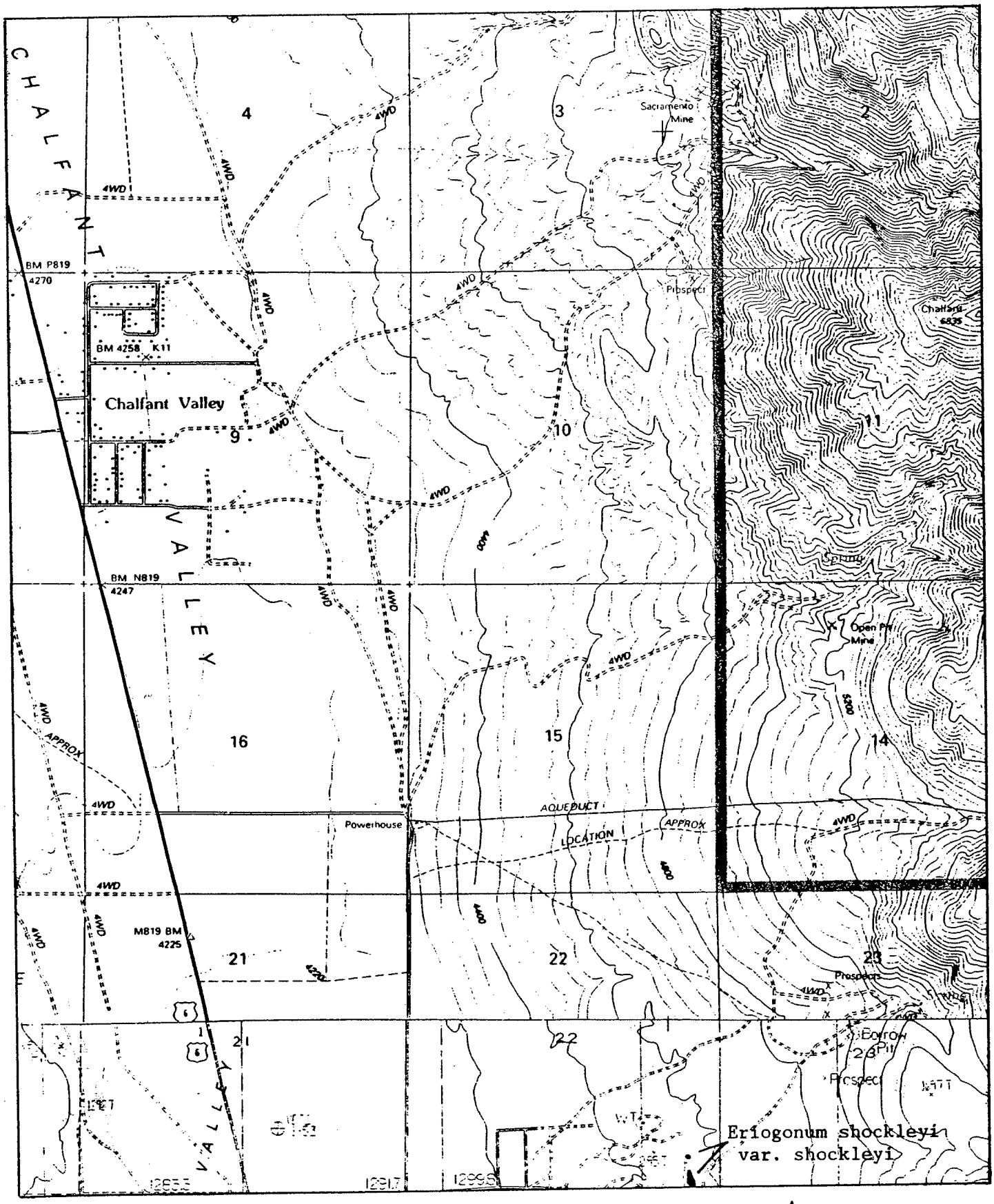
- ☒ Keyed (cite reference): Hickman, 1993
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☒ Other: ~~compared to known population at Crowley Lake~~

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☐ yes ☐ no

FG/WHDAB/1747 Rev.10/20/03



App. C. Location and extent of *Eriogonum shockleyi* var. *shockleyi* population on the USGS Laws 7.5' Quadrangle in Mono County, California (scale 1:24000).

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: WHDAB@dfg.ca.gov

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work: 05 - 21 - 04

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Eriogonum shockleyi var. shockleyi

Common Name: Shockley's buckwheat

Species Found? ☒ Yes ☐ No _____ If not, why?

Total No. Individuals 260 Subsequent Visit? ☐ yes ☒ no
Is this an existing NDDB occurrence? _____ Yes, Occ. # ☒ no ☐ unk.

Collection? If yes: no Number _____ Museum / Herbarium

Reporter: J. Paulus
Address: P.O. Box 244
Bishop, CA 93515
E-mail Address: _____
Phone: (760) 937-7177

Plant Information

Phenology: 100 % vegetative 95 % flowering _____ % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description *(please attach map AND/OR fill out your choice of coordinates, below)*

County: Mono Landowner / Mgr.: Bob Stark
Quad Name: Laws Elevation: 4520 ft
T 5S R 33E Sec 22 , SE ¼ of SW ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): _____
T___ R___ Sec ___ , ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
Datum: NAD27☐ NAD83☐ WGS84☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10☐ UTM Zone 11☐ *OR* Geographic (Latitude & Longitude)☐
Coordinates: Easting/Longitude _____ Northing/Latitude _____

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Alkaline, powdery white soil associated with a fault scarp. Population is situated between fault-controlled springs on an open, sunny slope (north-facing). Surrounding vegetation is Big Sagebrush Scrub, but all other shrubs near population are dwarfed. Occurs with Astragalus argophyllus var. argophyllus, Ivesia kingii var. kingii, also Cryptantha confertiflora, Castilleja miniata, Artemisia tridentata, Stanleya pinnata.

Other rare species?

Site Information Overall site quality: ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Current / surrounding land use: Existing housing 1000 ft downslope to west. BLM/LADWP to N, E, and S.
Visible disturbances: Population is adjacent to devegetated OHV trail, with many recent ATV tracks in the scrub, and through the population.
Threats: Site proposed for housing developemtn, groundwater developement.Apparent increased OHV incursions, groundwater pumping, which will increase with new housing.
Comments: This population extends onto BLM land at large spring complex immediately to south.

Determination: *(check one or more, and fill in blanks)*
- ☒ Keyed (cite reference): Hickman, 1993
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☐ yes ☐ no

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